METABOLISM AND DOSIMETRY OF PLUTONIUM INDUSTRIAL COMPOUNDS
PROJECT 2.1 OF LONG-TERM COLLABORATIVE RESEARCH PROGRAM
The preliminary report

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The pilot project of collaborative Russian-American research programme "Metabolism ..." involved the comparison, combination of radiochemistry methods used by DRMIA and USTUR. It was established there are some differences in radiochemical analytical techniques of both Registries. The main difference was found in the measuring instruments. DRMIA utilizes the radiometry method of direct actinides alpha-activity counting in stintillation power layer, USTUR uses alpha-spectrometry.

The main task on the first year of long term research programme is the performance of intercomparisons of radiochemical radioanalytical techniques and measuring methods for plutonium and ameriscium in tissue samples collected at autopcy of nuclear industries workers . The scientists of two Registries have stated the long term project since the spring of 1997 . In 31 of March the first meeting of programme participants took place at USTUR radiochemistry laboratory in Pullman. During this meeting it was carried out the exchange of 10 measured samples for interlaboratory comparison of measuring apparatus. The samples of DRMIA are Pu -bismuth phasphate precipitates mixed with ZnS(Ag) stintillation powder in cuvets; USTUR samples are the Pu and Am electrodiposited onto stainless steel planchets with known content of Pu-242 and Am-243 tracers correspondently. The measurements results have to be obtained for next three months.

Also the approches to comparison of radiochemical methods were discussed by radiochemists of both organizations. At this meeting. it was solved to exchange by 9-10 ashed samples of liver, lung and bone with three levels of Pu activity: in the range from MDA to 0.8 Bq. This exchange will be in summer July or August 1997.

Participants of the programme have come to agreement about the next meeting in August 1997 in Ozyorsk (Russia), where the results of radionuclides measuring comparison will be discussed. The interlaboratory comparison of radiochemical methods will be completed by the analyse of SRM - Standard Reference Materials of bone and liver, prepared by the US National Institute of Standards and Technology. However, DRMIA laboratory have difficulty in purchasing of expencive liver SRM due to money absence.

On the meeting in Richland the plane of the first Progress Report was out lined (summer 1997) . The participants of the meeting discussed the tasks to be performed for the first stage of the project and to be included. into the Progress Report. Three major tasks are to:

A. comparison of measuring instruments for actinides, used by the Registries. This task involves the obtaining and disscussing of results of samples alpha-activity measuring (cuvets and steel planchets) ;

B. establish of database format that can be used for tasks on Pu and Am metabolism (F,G,H) .This database format will contain exposure, medical and radiochemical analytical data;

C. relate tissue sampling methods used by the two Registries including specific tissues and organs sampled. The main difference in the kinds of bone and soft tissues samples will be discussed. The relationship of actinide concentration and total content of organs will be evaluated to determine correlation with total sistem burdens. However, due to absence of funding the DRMIA has no possibility to select autopsy tissue samples currently to assess the utility of the tissue sampling protocols used by each Registry.

In this report the approaches to performance of the next tasks E, I, K and L will be also discussed. Measuring of particals size distribution will be accomplished by a cascade impactor in workplaces of Mayak IA. However due to absence of funding the DRMIA has no filter type Whatman 40 for cascade impactor (task E). At the first phase of the project calibration of the DRMIA whole body counting will be accomplished with use of the Am-241 phantoms of Pacific Northwest National Laboratories (PNNL) at Richland (task I). There are some problems with performance of tasks K and L. Due to stopping in collection of autopsy samples DRMIA is not able to represent the lung samples to USTUR for autoradoigraphic method in present time (task K). FISH and GLA methods is to be performed by Dr

N.Okladnikova in clinic department. The DRMIA has no staff members for collection of fresh blood samples from workers (task L).

Assuming that the project begins on April 1, 1997, progress reports are planned for July 31 ,November 31 and conclusion riport for 31 march 1998. It is appear that accomplishing of tasks planned will lead to development of the unified analysis methods of data accumulated by the two Registries. Integration and analysis of data collected by DRMIA and USTUR is expected to allow Russian and American scientists to obtain already at first stage more complete understanding of actinides metabolism regularities in Man. This would provide an improved basis for establishment of radiation protection standards for workers and population.